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ABSTRACT

Fifteen upper-elementary teachers (regular and resource room) agreed to enact a new instructional model called Cognitive Strategy Instruction in Writing (CSIW). The model emphasized that teachers should model the cognitive processes of writers, scaffold dialogue with students about their writing, and create a social context in which writers consider audiences and purposes for their writing. Special attention was paid to the text structures used in reading and writing expository text. Teachers' enactment of CSIW was analyzed for its degree of congruence with the developers' vision of writing instruction, and there was significant variation among the teachers in their patterns of enactment that was related to variation in student performance. Those students whose teachers were considered to be "more congruent" (i.e., by enacting the model in ways intended by the developers) had better performance on transfer measures (but not on direct measures of what was taught), compared to students whose teachers used the model in "less congruent" ways. Qualitative data about four teachers support conjectures about relationships among teachers' beliefs about teaching, learning, and writing, their instructional practice, and their students' writing performance. (Four tables of data are included; 46 references are attached.) (Author/RS)

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Research Series No. 209

TEACHING WRITING WITH A NEW INSTRUCTIONAL MODEL: VARIATIONS IN TEACHERS' BELIEFS, INSTRUCTIONAL PRACTICE, AND THEIR STUDENTS' PERFORMANCE

Linda M. Anderson, Taffy E. Raphael,
Carol Sue Englert, and Dannelle D. Stevens

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Abstract

Fifteen upper-elementary teachers (regular and resource room) agreed to enact a new instructional model called Cognitive Strategy Instruction in Writing (CSIW). The model emphasized that teachers should model the cognitive processes of writers, scaffold dialogue with students about their writing, and create a social context in which writers considered audiences and purposes for their writing. Special attention was paid to text structures used in reading and writing expository text. Teachers' enactment of CSIW was analyzed for its degree of congruence with the developers' vision of writing instruction, and there was significant variation among the teachers in their patterns of enactment that was related to variation in student performance. Those students whose teachers were considered to be "more congruent" (i.e., enacting the model in ways intended by the developers) had better performance on transfer measures (but not on direct measures of what was taught), compared to students whose teachers used the model in "less congruent" ways. Qualitative data about four teachers are drawn upon to support conjectures about relationships among teachers' beliefs about teaching, learning, and writing, their instructional practice, and their students' writing performance.

TEACHING WRITING WITH A NEW INSTRUCTIONAL MODEL: VARIATIONS IN TEACHERS' BELIEFS, INSTRUCTIONAL PRACTICE, AND THEIR STUDENTS' PERFORMANCE[1]

Linda M. Anderson, Taffy E. Raphael,
Carol Sue Englert, and Danelle D. Stevens[2]

In the past decade, there has been a considerable amount of research and communication about cognition, cognitive processes, and the features of classroom instruction that foster meaningful and flexible subject matter learning (e.g., see Jones, Palincsar, Ogle, & Carr, 1987; Resnick, 1989; Prawat, 1989). This paper argues that, while such recent scholarship about cognition and instruction has increased our understanding of students' learning in schools, this scholarship alone will not contribute to changes in classroom practices and student learning on a large scale without concurrent attention to teachers' beliefs, interpretations of their practice, and learning.

This argument is especially relevant in the current reform context, when there are numerous calls for changing the nature of modal classroom practice from teacher-centered direct instruction about facts and skills to instruction that reflects alternative principles of teaching and learning (e.g., see Holmes Group, 1990). These alternative principles emphasize the importance of students' thinking and construction of meaning through interaction with others about complex, authentic problems, with teachers playing roles as facilitators and mediators of the students' developing understanding as they grapple with the problems. This vision of the teacher role contrasts to one in which teachers or texts are the sole source of knowledge that can be conveyed directly to students. While these principles have multiple roots, one perspective associated with them that guided the researchers in this study is social constructivist theory (Englert & Palincsar, 1991; Tharp & Gallimore, 1988; Vygotsky, 1978; Wertsch, 1985).

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[1] This paper was first presented at the annual meeting of the American Educational Research Association, in Chicago, April 1991.

[2] This paper is based on work done by the Cognitive Strategy Instruction in Writing Project, under the auspices of the Institute for Research on Teaching. Linda M. Anderson, associate professor, and Taffy E. Raphael, professor, who have joint appointments in the Departments of Teacher Education and Counseling, Educational Psychology and Special Education (CEPSE) at Michigan State University, and Carol Sue Englert, associate professor of CEPSE at MSU, were the project's co-ordinators. Danelle Stevens, instructor of teacher education at Whitman College, was a research assistant with the project.

In recent years, several experimental studies have been conducted to examine the effects of social constructivist approaches to instruction (e.g., see Brophy, 1989, for a collection.) In these experimental studies, the primary question of interest is often about effects on students. That is, researchers ask whether and how instruction based on social constructivist principles is associated with students' learning and development. However, other questions must also be asked by researchers who are interested in fostering changes in classroom instruction, questions that focus attention on teachers' perspectives about such changes and the challenges of changing teaching practice. Changing practice in the manner suggested by current calls for reform may require that teachers (and others) alter their fundamental views of instructional goals, teachers' roles, student roles, tasks, and the role of the social environment (Anderson, 1989).

This paper describes an experimental study in which both sets of questions were addressed. The researchers investigated both the responses of the students and the teachers to a new program for writing instruction called Cognitive Strategy Instruction in Writing (CSIW). This paper extends earlier analyses of the CSIW student outcomes data (reported in Englert, Raphael, & Anderson, in press; Englert, Raphael, Anderson, Anthony, & Stevens, 1991). These earlier reports show a clear treatment effect associated with CSIW, in that students of 15 teachers who had access to the program outperformed the students of teachers in a control group on measures of writing performance and metacognitive knowledge. The treatment effect was evident for both normally achieving students in regular classrooms and those labeled as "learning disabled" who were instructed within resource classrooms.

In contrast to earlier analyses of these data, this paper presents data analyzed at the classroom level, not aggregated by treatment groups. Furthermore, the analyses reported here combine qualitative descriptions of teachers' beliefs and practices with quantitative analyses of student performance measures. Attention is paid to teachers' beliefs because of an accumulating body of evidence suggesting that teachers' entering beliefs about the nature of the subject matter and how it is learned influence the extent to which teachers value and use new curricula and instructional models

(e.g., Hollon, Anderson, & Roth, 1991; Palincsar, Stevens, & Gavalek, 1989; Peterson, Fennema, Carpenter, & Loef, 1989).

Therefore, in order to understand completely what effects were associated with CSIW and how they were achieved, it is necessary to examine how different teachers perceived and enacted the program, and whether and how students' learning about writing was mediated by different patterns of teacher enactment. This paper addresses three questions:

1. Within the treatment group of 15 teachers, what variation was evident in the teachers' enactment of the CSIW program?
2. How did variations in teachers' enactment of CSIW relate to variations in students' writing performance?
3. How do teachers' patterns of enactment of CSIW relate to their beliefs about writing, teaching, learning, and learners, as revealed through cases of four teachers ?

Organization of the paper

First is presented the conceptual and empirical basis of CSIW and a description of the program. *Second*, the methods used to collect data about teachers' enactment of CSIW and their students' performance are described. *Third*, analyses and results are organized according to three research questions. *Fourth*, the discussion offers conjectures about how teachers' beliefs, their enactment of CSIW, and their students' writing performance were related. The discussion also reviews other research about teachers' enactments of instructional models based on constructivist views of teaching and learning.

Conceptual and Empirical Bases of the Cognitive Strategy Instruction in Writing Program

The writing performance of American students has received a great deal of attention in the last few years, usually in the form of reports that say too many students are unable to communicate effectively in writing (Applebee, Langer, & Mullis, 1986). Descriptive studies suggest that K-12 students are afforded too few opportunities to write extended text for meaningful purposes and real audiences. Instead, much school writing consists of single words or sentences. In many classrooms, even when assignments require students to compose extended text, the topics are often assigned by the teacher, the papers are read only by the teacher for evaluative purposes, and evaluation includes

careful scrutiny of punctuation, grammar, and spelling. Writing instruction often consists of attention to mechanics, without explicit instruction in how to think through the metacognitive aspects of writing, even in special education classrooms (Applebee, 1981; Bridge & Hiebert, 1985; Englert, Raphael, Anderson, Anthony, Fear, & Gregg, 1988; Goodlad, 1984; Scardamalia & Bereiter, 1986).

This portrayal of writing instruction in American schools is at odds with a social constructivist perspective, which considers that the development of literacy in all of its forms occurs when there is social and verbal interaction between more and less knowledgeable members of a culture around authentic tasks (Englert & Palincsar, 1991). This theoretical perspective is reflected in two complementary lines of work in the field of writing instruction that directly influenced the development of CSIW.

One line of work is that of process-writing advocates who assert that fluent writers develop only in social settings. Such settings encourage students to find their voice, engage in prewriting, drafting, and revising text that serves a personally meaningful purpose and to respond to and receive comments from their peers or other intended audience (Calkins, 1986; Graves, 1983; Murray, 1979).

Another line of work is offered by researchers who have studied the cognitive processes of fluent writers and the instructional methods that appear to promote strategic thinking about writing. Elements of recommended instruction include cognitive modeling, explicit attention to the mental processes that advance writing, and dialogue among novice and expert writers about the writing process and developing products. Within this perspective, teachers play roles as scaffolders of novices' developing ideas about how to write (Collins , Brown, & Newman, 1989; Bereiter & Scardamalia, 1987).

Each of these lines of work, considered within an overall social constructivist perspective, influenced the development of the writing curriculum and instructional model called Cognitive Strategy Instruction in Writing (CSIW) (Englert & Raphael, 1989; Raphael & Englert, 1990). The CSIW program was designed to help classroom teachers teach expository writing as a cognitive and social process that can be guided by strategic thinking to serve purposes that are important to authors.

The CSIW program was designed with a particular target group of students in mind: fourth- and fifth-grade students, including those identified as "learning disabled," who are approaching middle school and its demands for more independent reading and writing in content areas. Because of this focus on application to the content areas, the CSIW program highlighted the role of expository text structures. Research on text structures reveals that knowledge of underlying structures such as cause-effect, problem-solution, or comparison-contrast aids both reading comprehension and composition of expository text (Englert & Thomas, 1987; Meyer, 1975).

The process-writing literature cited earlier was reflected in the program through teaching about five interrelated aspects of writing, which were referred to by the acronym P.O.W.E.R.: Plan, Organize, Write (draft), Edit, and Revise. The Organize phase of writing occasioned the introduction of two text structures: explanation and comparison/contrast. The program reflected process-writing literature through its emphasis on development of a social context in which peers supported one another's writing efforts through roles as editors, consultants, and audience. Two recommended elements of the social context were publication of student writing (which was sponsored by the researchers and the school district) and public sharing activities such as "author's chair" (Graves & Hansen, 1983), in which children read their work aloud and talked with their audience about their work.

The cognitive-strategies literature cited earlier was reflected in the program through the instructional model recommended for teaching about the writing process. This model included three critical elements: (1) explicit teacher modeling ("thinking aloud") about the cognitive processes used by expert writers; (2) coaching by the teacher through scaffolded dialogue about authentic and personally meaningful writing tasks, with gradual reduction of teacher coaching and students assuming control over their thinking while writing; and (3) maintaining the social context in which dialogue about writing also occurs with peers.

Methods

Sample

Fifteen participating teachers were approached during the winter and spring of 1986 after the school district language arts coordinator identified potential schools to contact. Some of the schools had participated in one-day process-writing inservice programs, while other schools had requested such inservice but had not been served. While all teachers were volunteers, their principals and the district language arts coordinator encouraged them to participate. Ultimately, the sample consisted of eight "regular" classroom teachers in two different schools (four fifth grades, three fourth grades, and one third/fourth grade) and seven "resource" classroom teachers who taught fourth and fifth graders in those two schools and in five other schools. With one exception, the schools were located in a middle-sized urban district with ethnically-mixed populations. One of the resource room teachers taught in an adjoining district that was higher in socioeconomic status.

While all students in these teachers' classes received instruction based on CSIW, only those students whose parents gave permission took the performance measures. However, this included practically all students in those classrooms.

Curriculum Materials

A distinctive feature of the program was the use of think-sheets that cued students about critical questions that writers ask themselves. The think-sheets were intended to be used as scaffolds to serve the student in a way similar to the scaffolded dialogue with the teacher: they prompted student's thinking when needed, but were intended to be dropped by students as they internalized the questions. There was at least one think-sheet for each phase of the writing process. For example, the *planning* think-sheet posed questions about audience and purpose ("Who am I writing this for? Why am I writing this?"), and prompted brainstorming. The *organize* think-sheet differed by text structure. For example, for explanations, the organize think-sheet prompted students with questions like, "What is being explained? What comes first? second? third?" The *writing* think-sheet was simply a lined sheet of colored paper (not white, because the intention was to encourage students to think of it as a first draft that could be changed). The *edit* think-sheets, like the *organize* sheets, varied by text structure,

and posed questions both to the author (for self-editing) and to a reader such as, "Does it state what is being explained?" Finally, the *revise* think-sheet prompted the student to make a plan for revision before writing a second or later draft. The think-sheets and other elements of the program are presented in Englert and Raphael (1989) and Raphael and Englert (1990).

Staff Development Activities

Participating teachers attended two one-day fall workshops (one before the beginning of school and one in October) at which the program was presented, modeled, and discussed. Once teachers began instruction with CSIW, they were visited by one of the researchers every one or two weeks. During these visits, the researcher sometimes assisted the teacher (perhaps by working with individual students or occasionally teaching lessons), sometimes observed instruction, and almost always consulted with the teachers about their particular ideas or concerns about CSIW. Group meetings were held before or after school about once a month and whenever teachers requested them.

Thus, while some elements of staff development were comparable for all teachers (workshop content, access to consultation), other elements differed depending on the teacher's desire for consultation and availability for meetings. The seven members of the research team consisted of three faculty and four doctoral students, and each researcher was assigned two or three teachers for purposes of consultation and data collection. These researchers met regularly with each other to discuss the program and the comparability of their consultation activities.

Measures

Data reported in this paper come from a variety of sources. The teachers were interviewed and observed during the Spring of 1986 in order to learn about their thinking and practice before any intervention. They were observed throughout the year in which they used CSIW (1986-87), and they were also interviewed at the end of that year (Spring, 1987). Students took performance measures in Fall, 1986, and again in Spring, 1987.

Observation measures. Classroom observations were the primary data analyzed for the first research question concerning variation in teachers' enactment of CSIW. There were two types of

observations: Formal and informal. [Copies of complete observation guides may be obtained from the authors.]

Formal observations were conducted during a half-day of school, and included other subject areas besides writing. At least three formal observations of each teacher were completed during the 1986-87 year while CSIW was being used. During formal observations, the observer played no other role in the classroom. Narrative descriptions of events were maintained following a set of guidelines that specified the questions to be answered by the observation record (e.g., "How does the teacher introduce the lesson, and what in the introduction (or any part of the lesson) might communicate a purpose for the writing that is being done?"). After observations ended, the observer dictated or typed a complete record of the observation based on the notes taken in class. Observers were trained by use of videotapes with group discussion and critique of observation notes.

Informal observations were less systematic and detailed. These were conducted whenever a researcher/consultant visited her assigned teachers, which usually occurred about once a week during the 1986-87 year. (However, due to illness and one temporary reassignment of a teacher, this schedule was not maintained in all instances.) Because the researcher/consultant might play an active role in the lesson or spend time interacting with students, some of the informal observation notes were dictated immediately after the visit ended, based on the researcher's memory of events that day. In order to maintain some comparability for the informal observations, these retrospective accounts were prompted by a set of standard questions about the ways the CSIW program was used (e.g., "What were the major activities during your visit? What phase(s) of the writing process and what text structure(s) were the focus? Has there been earlier instruction from which today's lesson was an extension?").

All observation notes were transcribed and coded with identification numbers in place of teachers' names. Analysis procedures for these data are described in the results for the first research question about variations in teachers' enactment of CSIW.

Writing performance measures. Various writing performance measures and measures of metacognitive knowledge about writing were the primary sources of data discussed for the second research question about the relationship between teachers' enactment and student performance. In all

cases, these were administered in both the fall and spring of the year by the researchers The only students whose scores were included in the analysis were those who had both a pretest and posttest score available for a given measure. (Numbers for each analysis are included in Table 2, after page 18.)

The writing performance measures were of two types, each of which included two measures: *Taught text-structure measures* (explanation and compare-contrast) and *non-specified text-structure measures* (expert passage and a reading/recall task).

Taught text-structure measures required students to write (a) an explanation of how to do something they knew a lot about (e.g., how to play a game, make a particular object) and (b) a paper that compared and contrasted two things, people, or places that they knew a lot about, describing how these two things were alike and different. These two text structures were the object of instruction in every classroom. In both cases, students were given the general directions to write for an audience that did not know as much about their topic as they did. They were provided paper and told that spelling assistance was available if desired. However, the researchers did not provide responses about the actual organization or substance of the writing. Students had as long as they wished to complete the task. In a few cases where students had extreme difficulty with handwriting, they dictated their ideas to a researcher.

Non-specified text-structure measures reflected the students' knowledge and use of text structures when the text structures were not specified. Thus, they might be considered measures of students' abilities to transfer their knowledge of text structure to new situations where they were called upon to impose organization on text. In the expert passage, students were asked to write about a topic about which they knew a lot for someone who did not know as much. No particular text structure was suggested as with the taught-text measures.

In the reading recall measure, students read a non-fiction passage that incorporated both explanation and compare-contrast structures. Previous research which suggested that successful comprehension performance is associated with free recall and summarization abilities supported the use of this task (Meyer, Brandt, & Bluth, 1980; Spivey, 1984). The recall passages were written at two readability levels based upon the Spache readability formula (Spache, 1953). Students were assigned

either a 1.8 reading grade-level passage or a 2.8 grade-level passage, depending on their teacher's indication of their reading level. This distinction ensured that all students were able to independently read the passages. Students were given directions to study the passage until they could recall it. Then they signalled the researcher, who removed the text, and the students wrote what they remembered about the passage. Again, no direct cues about text structure were given, although knowledge of the two taught structures could aid storage and recall of the information. In all cases, these writing performance measures were scored for both the structural elements of the writing, and also for reader sensitivity, as described in the Results section.

The measure of *metacognitive knowledge* about writing was a 13-item questionnaire based on results from an earlier interview study (Englert et al., 1988). Items were drawn from two vignettes, each representing a student's writing, and were adapted to a multiple-choice or fill-in-the-blank format. For example, the first vignette in the original interview focused on students' knowledge of text organization in planning ideas for an expository paper. When questions were transformed from the original open-ended form of the interview into multiple-choice items, the distractors (i.e., the choices revealing less metacognitive knowledge) were taken from actual responses by students in the earlier interview study. Questions that did not lend themselves to multiple-choice format (e.g., What ideas should she include in her paper?) were presented as open-ended questions to which the students responded in writing.

Teacher interviews. Together with the observational data, teacher interview data were used to address the third research question concerning the relationship between teacher beliefs and enactment of CSIW. During the spring of both 1986 and 1987, teachers met individually with the primary researcher/consultant for their classrooms. The interview generally followed a standard set of questions, although the researcher probed and adjusted the questions as seemed reasonable during the interview. Complete copies of the teacher interviews are included in a technical report which may be obtained from the authors.

Key questions during the first interview (before the introduction of CSIW) were to describe typical writing instruction in that classroom, specify one's goals for writing instruction, discuss what

characterized better and poorer writers and their needs, and to respond to a child's writing sample. From these questions, the researchers hoped to infer the teachers' goals and conceptions of writing as he or she began to use CSIW. The interview in the spring of 1987 elicited the teacher's response to the program as a whole and suggestions for modification, as well as asking directly if and how the teachers thought their thinking and practice had changed, and what changes in student writing they saw, compared to previous years.

Results

Question 1: Variation in Teachers' Enactment of CSIW

Even though all 15 teachers attended similar staff development activities, they interpreted and valued the CSIW model in very different ways. These differences, with corresponding differences in their use of CSIW, were evident to the researchers early in the school year. Because the purpose of the study was to examine how teachers enacted CSIW in realistic conditions, rather than test the effects of a uniformly delivered program, the researchers did not intervene to change the teachers' use of the model except in direct response to the teacher's questions and concerns. In all cases--even those teachers whose practice was later deemed to be less congruent with CSIW principles than the practice of other teachers--there was a significant amount of interaction between teachers and researchers about the program, and every teacher attempted to use the program on a regular basis for the entire year.

Analysis of Observation Measures

Analyzing the observation data required the researchers to develop an operational definition of the construct of "degree of congruence with the developers' vision of CSIW." Teachers whose practice appeared to reflect the underlying principles of writing instruction imbedded within CSIW were designated as more congruent, while teachers whose practice did not appear to reflect those principles were designated less congruent.

These designations were not intended to imply that teachers were at fault or were less good as teachers if they did not use the program as it was envisioned by its developers. Rather, it was assumed that for some teachers and classes, congruence with the developers' vision might be difficult to attain for a variety of reasons related to the interaction of CSIW and its demands, the teacher's preferences

and beliefs, and the students' reactions. Our goal in identifying cases of more and less congruence was to learn more about the conditions under which this particular instructional program was or was not a worthwhile tool for teachers.

Scoring procedures. One strength of the study's design for some purposes was the close tie between the researcher/consultant and her teachers. Because each teacher was seen by only one researcher (except for some of the formal observations), it was easy to develop a working relationship based on shared knowledge of a particular classroom. However, this very strength was a potential liability in analyzing the observation data and substantiating intuitions about the variation among teachers' enactment of CSIW. Therefore, a system for reviewing the observation records was developed to ensure that multiple points of view would inform comparisons of teachers' enactment of CSIW.

At the end of the 1986-87 school year, all narratives for a given teacher were assembled and all names were removed (although code numbers remained). Then full sets of narratives were read independently by three different readers: (1) the observer who had been assigned to that teacher; (2) a researcher who had worked in another school and was therefore familiar with the program but not with that particular teacher; and (3) a research assistant who was knowledgeable about writing instruction but who had not worked with the project until the narrative analysis began. This third reader was unfamiliar with any of the teachers as individuals and knew CSIW only through written materials and discussions with the rest of the staff.

Initially, before the rating scales were devised, the two raters, who had not observed a given teacher, wrote summaries of that teacher's writing instruction, following a common outline. On the basis of these descriptions, the research staff constructed five seven-point scales that could be used to describe teachers' practice in terms of critical features of CSIW as defined by the developers.

The scales were defined in these ways:

1. Writing as a cognitive process. The thinking that underlies the writing process is made explicit in the teacher's and students' talk, and the teacher focuses the students' attention on their thinking much of the time.

2. Writing as a communicative process. The teacher conveys that writing serves meaningful purposes for informing, communicating, and stimulating, not just evaluating.

3. Teacher-student dialogue. Teacher-student interaction about writing is dialogic in nature, with teacher responding to student writing and encouraging students to make their thinking about writing explicit.

4. Modeling of cognition. The teacher uses think-alouds to model the cognition that underlies strategic writing processes.

5. Student-student interaction. Peer interaction around writing is fostered by the teacher, who communicates that students are resources for one another's thinking and writing.

The three readers for each teacher independently assigned values from one to seven for the teacher for each scale. For two teachers a fourth rater also scored the data when one of the original raters' scores (on one scale for each teacher) appeared to be highly discrepant with the others. In the final analysis for these two teachers, the fourth rater's scores substituted for the original ratings.

Agreement among raters. Agreement was computed as the percent of pairs of raters who agreed with each other within one or two points on the seven-point scale. Across all ratings and all pairs of raters, agreement within one point occurred 76% of the time and agreement within two points occurred 96% of the time. When calculated by separate rating scales, the percentage of rater pairs who agreed within one point were, on the five scales, respectively, 80%, 82%, 73%, 82%, and 69%. The percent of rater pairs who agreed within two points on each scale were, respectively, 100%, 96%, 96%, 93%, and 91%. All raters pairs agreed within three points of one another on the seven-point scale (at least this level of agreement was reached after substituting a fourth rater's scores for two teachers whose original rater was highly discrepant with other raters on two scales).

Thus, while agreement was not perfect, the pairs of raters did view the teachers similarly in terms of their general level of congruence with the developers' vision of the program, although their discriminations along a seven-point scale were not considered to be reliable enough to maintain the data at that level of precision. Therefore, the original ratings were used to create a more global score to indicate degree of congruence. First, all ratings for a given teacher were averaged across scales and across raters. Then, the distribution of average ratings across all teachers was examined and three levels of congruence were identified. Seven teachers whose average rating was 2.5 and below were considered to represent lower congruence with CSIW than the other teachers. Three teachers whose average ratings ranged from 2.8 to 3.3 were considered to represent medium congruence. Five teachers

whose average ratings ranged from 4.9 to 6.2 were considered to represent higher congruence with the program, compared to other teachers.

Table 1 presents descriptive data about the 15 teachers. Resource and regular classroom teachers are represented about evenly in each group, suggesting that the level of congruence was not predictable from the type of classrooms.

The data in Table 1 raise questions about possible school effects on the teachers' enactment of CSIW. While location in one school or the other did not determine degree of congruence completely, School A has more regular classroom teachers with higher ranks than School B, suggesting that factors associated with the schools may account for some differences in teachers' ways of enacting programs like CSIW. Although both schools enrolled racially and economically diverse populations, School B did enroll more students from lower socioeconomic status families than School A. However, the teachers in the two schools also differed in their ways of talking about the students and about writing, with more teachers from School B expressing low expectations for their students and beliefs that writing was primarily a matter of learning correct forms (as exemplified in the case of Ms. Avery, offered later in the paper). Thus, school-level differences in the degree of congruence can not be attributed solely to either student or teacher factors associated with the schools, since the relative effects of these factors cannot be determined from the available data.

This paper does not attempt to sort out what kinds of school effects may have been present, but rather concentrates on classroom-level dynamics in order to understand how CSIW might have influenced the students. However, it is important to remember that teachers work within larger school contexts, which may be powerful influences on their beliefs and actions. The researchers' choice to look only at the classroom level of analysis was not intended to deny that individual teachers may have been influenced by their colleagues and other factors associated with their schools.

One notable feature of these data is the generally low level of congruence of instruction with the developers' visions of writing instruction as portrayed in CSIW. Two-thirds of the teachers received average ratings below the midpoint of the rating scales. This means that, in the raters' eyes, most of the teachers were not teaching writing in ways that were highly congruent with the underlying

principles of the instructional model that was the focus of the study. This is not too surprising given that this was the first year that the teachers had used CSIW, and it was a complicated program that represented for some teachers an extreme departure from their usual writing instruction. The cases offered in the third part of this paper shed some light on ways in which lower levels of congruence were reasonable from the perspectives of some of the teachers.

Another notable feature of these data is their variability. Ratings of teachers within the treatment group--all of whom had received extensive consultation and support for using CSIW during the year--ranged from a very low to a very high degree of congruence. This variability raises questions about earlier analysis of student performance data that were aggregated by treatment group, specifically the relationship between teachers' enactment of CSIW and students' performance. These questions are addressed below.

Question 2: Variations in Students' Performance That Are Related to Variations in Teachers' Enactment of CSIW

As reported in Englert et al. (1991) and in Englert et al. (in press), the writing performance and metacognitive knowledge of students in the 15 treatment classrooms was better than performance of the students in the control classrooms in a variety of measures, all adjusted for entering level of performance. However, the variation of teachers' practice within the treatment group raises questions about the nature of the treatment effect that can only be addressed by additional analyses at the classroom level. Without these additional analyses, alternative explanations for treatment differences cannot be dismissed.

One alternative explanation is that student performance in the treatment group was influenced by the heightened expectation that students would write and that teachers would converse with them about their writing, regardless of the quality of that conversation. Another possible explanation that might reconcile the treatment effect and the variability among treatment teachers is that the treatment group's superior performance was attributable primarily to the gains made in a few classrooms, not across the treatment group as a whole. In short, the variation in teachers' practice raises questions about how and why any effects on student learning can be attributed to the CSIW

program. In order to address these questions, student performance data were reanalyzed in order to determine the effect of the congruence level on students' adjusted posttest scores.

Scoring Procedures for Writing Performance Measures

The three writing measures--explanation, comparison/contrast, and the expert writing task--were scored in similar ways. The reading recall task was scored using a different system.

The three writing measures were scored by six trained coders blind to the classroom placement of the students. (That is, the coders did not know which students were in treatment or control or regular or resource classrooms, nor did they know students' achievement levels.) Each students' composition was read independently by two coders who assigned three scores per paper: (1) a primary-trait score based upon the degree to which the composition used the required organizational pattern for a specific text structure and to which it contained the appropriate key words and phrases (Mullis, 1980); (2) a holistic score ranging from 0-3 points based on the degree to which the paper was interesting and effectively communicated the top-level structure associated with a particular text structure form (Meyer, 1975); and (3) a reader-sensitivity score that represented the extent to which the author showed sensitivity to his or her audience and ownership of the paper

Primary trait scoring varied by the nature of the writing task. For *explanation* papers, four primary traits were assigned individual ratings (ranging 0 to 3 points) for a maximum score of 12 points. These traits included (1) introduction to the topic being explained; (2) provision of a comprehensive sequence of steps; (3) inclusion of key words or signal words (e.g., first, second, third, finally); and (4) adherence to explanation organization (i.e., introduction, sensible sequence of steps, closure).

For *comparison/contrast* papers, five primary traits were assigned individual ratings (ranging from 0 to 3 points) for a maximum score of 15 points. These traits identified whether the paper successfully (1) identified two things being compared and contrasted; (2) described how the two things were alike; (3) explained how the things were different; (4) used key words (e.g., alike, different, but); and (5) adhered to the comparison/contrast organization (i.e., introductory sentence, alikes/differences, conclusion).

For the *expert* papers (i.e., the nonspecified text-structure paper about any topics chosen by the student), six primary traits were assigned individual ratings (ranging from 0 to 3 points) for a maximum score of 18 points. These traits identified whether the paper successfully (1) introduced the reader to the topic; (2) introduced and labeled each category; (3) provided sufficient depth of information within each category; (4) provided sufficient breadth of coverage related to the topic across the categories to adequately discuss the topic; (5) used key words appropriately (e.g., first, second); and (6) adhered to a reasonable overall structure (e.g., introductory sentence, two to three relevant categories, and conclusion).

Holistic scoring yielded a subjective rating of the overall appeal of the paper, as well as the extent to which the student had accomplished the purpose of writing either an explanation, comparison/contrast, or expert paper. For all three types of text structures the holistic rating ranged from 0 to 3 points.

Reader sensitivity scores represented the author's ability to produce reader considerate text (Armbruster & Anderson, 1982). Specifically, four traits were assigned individual ratings from 0 to 3 points for a maximum score of 12 points. These traits were the extent to which the paper included (1) an introduction that grabbed the reader's attention in an interesting way (e.g., use of dialogue, questions, and so forth); (2) an explicitly stated purpose; (3) an awareness of communicating with the audience (e.g., asking questions of the reader, providing thorough information about the topic to answer readers' questions, use of "you" pronominal); and (4) the author's voice (e.g., author's use of personal humor, references to self and opinions, use of dialogue).

Scoring of the non-specified text structure *reading recall measure* (in which the student read a passage and then wrote a summary of the passage after it was removed) also involved two coders independently assigning scores to each student's paper without knowledge of classroom placement. Papers were assigned scores from 0 to 13 based on the degree to which their recalls reflected the primary traits and structure of the stimulus passage.

Agreement for scoring of writing measures. Ten percent of the pairs of scores generated through scoring of the writing measures were examined for the level of agreement across coders. Agreement was

calculated by dividing the number of agreements by the sum of agreements plus disagreements. On all variables, agreement was above 80%.

Scoring procedures for students' metacognitive knowledge measures. Since the metacognitive questionnaire generally involved the scoring of multiple choice responses, the scoring procedures simply entailed the assignment of one point for correct responses and zero points for incorrect responses. For the short answer responses, students' written responses were compared to criterion answers. Agreement between coders for this scoring was 98%.

Analyses of student performance data and congruence data. Student scores on each measure were converted to z-scores to allow holistic and primary trait scores to be combined. These z-scores were used in the analyses reported here.

Six scores were created for analyses:

1. The combined taught text-structure score: the holistic and primary trait scores for both the taught-text structures were combined into one score (called here *taught-structures total*)
2. The combined reader sensitivity scores for the two taught-text structure papers (called here *taught-structure reader sensitivity*)
3. The combined primary trait and holistic scores for the expert passage (called here *expert total*)
4. The reader-sensitivity score for the expert passage (called here *expert-reader sensitivity*)
5. The reading-recall organization score (called here *recall organization*)
6. The metacognitive knowledge score

Means and standard deviations for the fall and spring scores for students in each group---higher, medium, and lower congruence---are given in Table 2. The *N*s represent the number of students who had both fall and spring scores available for each of the measures that made up the new combined variable. Thus, only students who were in the classrooms for the entire year (and present for all testing) were included in the analyses.

Students' spring scores for these six variables were then subjected to an analysis of covariance, using fall scores as covariates. Thus, individual differences in entering performance levels were taken

Table 1

Teachers' Degree of Congruence With Developers' Vision of CSIW

Congruence Level	Teacher	Average Rating	Classroom Type	School
Lower	B	1.3	Regular	b
Lower	M	1.4	Resource	f
Lower	K	1.7	Resource	s
Lower	A	2.0	Regular	b
Lower	O	2.5	Resource	a
Lower	J	2.5	Resource	c
Lower	C	2.5	Regular	b
Medium	E	2.8	Regular	a
Medium	D	3.0	Regular	b
Medium	I	3.3	Resource	b
Higher	G	4.9	Regular	a
Higher	F	5.1	Regular	a
Higher	H	5.4	Regular	a
Higher	L	6.1	Resource	e
Higher	N	6.2	Resource	g

Table 2

Means and Standard Deviations of Fall and Spring Scores

	Lower Congruence Classrooms					Medium Congruence Classrooms					Higher Congruence Classrooms				
		Fall		Spring			Fall		Spring			Fall		Spring	
Score	*N*	Mean	*SD*	Mean	*SD*	*N*	Mean	*SD*	Mean	*SD*	*N*	Mean	*SD*	Mean	*SD*
Taught Structures Total	75	-.48	1.56	.12	1.98	38	.14	1.93	.63	1.46.	52	.24	2.23	.50	1.85
Taught Structure Reader-Sensitivity	75	-.32	.80	.07	.88	38	-.09	.71	.05	.98	52	.18	1.15	.62	1.37
Expert Total	78	-.36	1.68	.09	1.70	41	.31	2.06	.09	1.90	75	-.19	1.82	.80	2.08
Expert-Reader Sensitivity	78	-.16	.87	-.12	.84	41	.12	.90	-.14	.97	75	.17	1.08	.58	1.19
Recall Organization	76	-.34	1.79	-.45	1.49	41	.45	1.57	.00	1.75	71	.24	1.94	.86	2.22
Metacognitive Knowledge	75	-.14	.99	-.14	.96	38	.30	.99	.24	.99	52	.26	.98	.39	.75

Table 3

Results of Analysis of Covariance of Spring Performance Scores

	Covariate		Degree of Congruence	
Measure	*F*	*p*	*F*	*p*
Taught Structures Total	34.15	.000	.478	.621
Taught-Structure Reader Sensitivity	25.32	.000	2.57	.080
Expert Total	10.29	.002	4.28	.015
Expert-Reader Sensitivity	4.38	.038	8.78	.000
Recall Organization	112.57	.000	5.96	.003
Metacognitive Knowledge	53.24	.000	2.88	.058

into account while determining the relative effect of teachers' congruence level on spring scores. Results for the analyses of covariance are given in Table 3.

For all variables, the best predictor of spring scores was the covariate--the corresponding fall score. The degree of congruence also significantly predicted writing performance, but only for some of the measures. For the two measures drawn from the explanation and compare-contrast writing tasks (taught-structures total, taught-structure reader sensitivity), level of congruence did not significantly predict spring scores. In contrast, for the transfer measures in which the text structure was not specified (expert total, expert-reader sensitivity, and recall organization), the degree of congruence was a significant predictor of spring scores. When metacognitive knowledge scores were analyzed, degree of congruence did not significantly predict spring scores, although the result bordered on significance ($p<.06$).

Conclusions drawn from analyses of student performance data. The most straightforward component of CSIW was the presentation of the two taught-text structures (explanation and compare/contrast). Suggestions for how to teach about text-structure features were presented explicitly in the teachers' manual. All 15 teachers taught these lessons and talked explicitly about the organizational forms and the key words that were associated with them. Most of the year during CSIW instructional time, students worked on papers that were either explanations or comparison-contrasts. They learned the distinguishing features of each text structure and were encouraged to write papers with those features. In the spring, when the students were asked to write explanations or comparison/contrasts for the posttests, they were essentially being asked to repeat a familiar task and to reproduce an organizational form that they had been taught. They did not have to analyze a writing problem to determine how best to organize it for a given purpose. They only had to recall what they had been taught about producing the two structures. Consequently, students tended to make similar gains on the measures of the taught text structures, regardless of their teachers' congruence levels.

In contrast, when asked to write the expert passage or to read a passage and write a recall, students had to determine what form of organization made the most sense given the writer's purpose.

Students could elect to use a taught structure or could organize their papers in other ways. These measures posed a harder problem for young writers than the measures that made up the taught-structures scores and required greater flexibility of knowledge about text organization and about the writing process. In this sense, the expert and recall measures could be considered as tests of transfer of knowledge from the original tasks to a less familiar task, requiring greater internalization and control of cognitive processes by students.

Analyses indicated that teachers whose enactment of CSIW was closer to the developers' vision of writing instruction had students who performed better on measures that required greater problem solving and transfer of knowledge about the organization of text. These were teachers whose higher congruence ratings reflected more cognitive modeling, greater emphasis on writing as a cognitive and social process, greater promotion of student-student interaction around writing, and interactive teacher-student dialogue about writing strategies, which may have encouraged students to appropriate writing strategies for their personal use.

In contrast, the students of teachers whose enactment of CSIW was less congruent with the developers' vision did less well on the transfer measures, but performed equally well when asked to reproduce what had been directly taught to them about text structure. These teachers' lower congruence ratings reflect their tendency to more rigidly follow the guidelines in the teachers' manual for the writing program, more often emphasizing the surface or mechanical features of text structures, without an emphasis on the social and cognitive processes that underlie writing. Specific examples of these differing approaches are provided in four cases presented in the next section.

The results for the metacognitive questionnaire do not suggest that the students of the more congruent teachers made significantly greater gains in metacognitive knowledge, at least as it was measured with this instrument. This is puzzling if the other results are interpreted to mean that students of more congruent teachers were more independent and flexible with their knowledge about writing. If that is so, then their more flexible knowledge would be expected to show up on measures of metacognition. Perhaps the metacognitive knowledge questionnaire elicited declarative knowledge about the writing process (which had been the focus of some formal lessons), and that was acquired by

all students about equally well. However, the writing performance measures may have better indicated the procedural and conditional components of metacognitive knowledge about writing.

Results for Question 3: How Are Teachers' Patterns of Enactment of CSIW Related to Their Beliefs About Writing, Teaching, Learning, and Learners?

The data presented for Questions 1 and 2 suggest that the 15 classrooms in the treatment group constituted different environments for learning to write, with associated differences in students' performance at the end of the year. These data raise questions about why the variations in enactment existed and call for a detailed examination of the instructional environments and the ways in which they reflected teachers' beliefs, goals, and interpretations, as well as the ways in which they reflected constraints that hindered teachers' enactment of CSIW.

To conduct such a detailed examination, the qualitative data for four teachers were used to construct cases that show how beliefs and practice were related. The four cases are not presented as a representative sample of all CSIW teachers, and no generalizations are drawn from them. However, comparisons of the four cases do suggest some hypotheses or conjectures about factors that explain differences in teacher congruence and student performance.

Selection of Four Cases

Selection of 4 of the 15 teachers considered balance across classroom types (i.e., regular and resource) and congruence (higher and lower extremes). The four teachers who were selected will be referred to by pseudonyms: Ms. Avery (lower congruity, regular classroom), Ms. Baker (higher congruity, regular classroom), Ms. Cassells (lower congruity, resource classroom), and Ms. Donovan (higher congruity, resource classroom). Ms. Avery and Ms. Baker both taught fourth-grade students, and Ms. Cassells and Ms. Donovan taught upper elementary students, although only fourth- and fifth-graders' data are included in these analyses. To aid the reader in following and comparing the cases, Table 4 presents summaries of the characteristics of each teacher.

Qualitative Analyses of Teacher Interviews and Observations

In order to describe the four teachers in a manner that allowed comparison, a systematic review of each data source was undertaken and summaries were written according to a common outline for each

teacher. Summaries of observation notes for each teacher were written by two of the three raters, and these were compiled by one of the authors, who also was the sole reader of the interviews and who compiled the full cases. Although the cases were prepared by one person, they were reviewed by others on the research team who were familiar with the teachers.

Pre-CSIW interviews. Interviews conducted in the spring preceding the CSIW year were read in their entirety and notes were taken about teachers' responses that revealed their beliefs, assumptions, and questions about each of the following issues or topics. At least one direct question was asked about the issue or topic in each interview, but the summaries drew from teacher statements anywhere in the interview that provided some insight into the teacher's thinking. The general areas explored during the interview included:

1. Description of current writing instruction and kinds of writing opportunities for students before CSIW was introduced
2. Goals for writing instruction at this grade level
3. Beliefs about the characteristics of good and poor writers and what kind of instruction poor writers need (including a vignette in which the teacher was shown a sample of writing by a student who has been designated "learning disabled"; the passage evidently attempts to be about baseball, but it is not well organized and contains many errors of spelling and punctuation. Teachers were asked what feedback they would give the child)

CSIW-year observations and conversations. As described in the methods section, both informal and formal observation notes were taken and used to create the congruence ratings, as described in the results for Question 1. For the current paper, the observation notes (which included records of conversations with the teacher) were reviewed and summaries written in terms of the five dimensions defined for the ratings and described in the methods section of this paper:

1. Writing as a cognitive activity
2. Writing as a communicative activity
3. Use of teacher-student dialogue about writing processes
4. Teacher modeling his or her thinking about how to write
5. Student-student interaction in the classroom about writing

Table 4
Key Features of Four Cases

Teacher and Congruence Rating	Type of Classroom	Pre-CSIW Goals for Writing Instruction	Pre-CSIW Writing Tasks	Writing Instruction During CSIW	Evaluation of CSIW at End of Year
Ms. Avery (Lower Congruence)	Regular 4th grade	Sentence and paragraph formation. Complete sentences with capitalization and punctuation.	Sentence level (e.g., answering reading comprehension questions). Limited amount of writing allowed until correct sentence formation demonstrated.	Taught 2 times a week. Presented text structure and think sheets as described in formal lessons. Few discussions about writing outside of CSIW time. Little public sharing of writing. Peer editing occurred but otherwise interaction was not encouraged except under teacher direction.	Liked and will use again. Likes emphasis on organization of papers, but thinks better recipes are needed for some text structures.
Ms. Baker (Higher Congruence)	Regular 4th grade	Selecting main ideas and building topic sentences, but also to be able to communicate on paper.	Summaries and personal reactions in several subjects. Some writing shared with peers and published.	Taught 2 to 3 times a week. Presented text structure and think sheets in formal lessons. Emphasized recursive, connected nature of writing. Connected CSIW to writing in other subjects. Encouraged peer interaction.	Liked and will use again. Liked emphasis on student expression of ideas and students working together.
Ms. Cassells (Lower Congruence)	Resource	Communicate in writing. Complete sentences with capitalization and punctuation.	Short-answer questions and copying off board.	Teacher often read from teachers' manual. Think-sheets presented in procedural way. Little talk about cognition underlying writing. Some peer editing occurred but interaction was not otherwise encouraged.	Liked and will use again. Liked how the program "broke down" the writing task into components.
Ms. Donovan (Higher Congruence)	Resource	Get ideas from mind to paper. Helping children become comfortable with mechanics.	Individualized assignments. Variety of writing included story and journal writing, sometimes on computer. Teacher sometimes taught about strategies.	Taught 2 times a week presenting text structure and think sheets in formal lessons. Much elaboration on ideas during interactions with students about their writing. Encouraged student interaction.	Liked and will use again. Especially liked the focus on student thinking and ways it helped her connect different kinds of writing assignments.

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Post-CSIW interviews. At the end of the school year, each consultant met individually with her teachers and talked about CSIW and the teachers' plans for future use, recommendations for change in the program, and perceptions of change in herself or in the students. These interviews were read in their entirety and teacher comments were noted about the following issues or topics. Again, there were direct questions about each of these, but comments from any point in the interview were used to describe the teachers' points of view about:

1. Reported changes in practice and thinking (i.e., how, if at all, did the teacher think that he or she had changed with regard to writing instruction)

2. Reported changes in students' writing (i.e., what, if anything, did the teacher notice about students' writing this year that seemed different from years past?)

3. Characteristics of poor writers and CSIW's effect on them (i.e., the same question that was posed in the pre-CSIW interview about characteristics of "poor writers" was asked and teachers were asked if their ideas about poor writers had changed. Also, teachers were asked whether and how they felt that "poor writers" had been affected by CSIW.)

4. Comments about CSIW and recommendations (i.e., teachers were asked about their most and least favorite parts of the program, about each component of the program such as the think-sheets, and were asked to describe either adaptations they had made or changes they would recommend)

Below are presented summaries of the cases.

Ms. Avery (Lower Congruence, Regular Classroom)

Ms. Avery participated actively in the project, raising many questions, suggesting modifications, and adapting the program to her classroom as she felt appropriate. Throughout her involvement with the research project she conveyed real concern about her students' learning to write better and had participated in a lot of professional development activities related to this. Although she said she did not like teaching writing to "this level" because of her frustration at their lack of skills, overall she expressed confidence in herself as a writer and a teacher of writing.

Ms. Avery expressed firm convictions about her students' needs and the best ways to teach writing. She did not express as many questions as some of the other teachers about what she should or could do but instead conveyed her sense of certainty about teaching in general and writing instruction in particular. She described her writing goals in terms of students becoming competent with sentence and paragraph formation. Almost all of her talk about "good writing" and "good writers" and "poor

writers" centered on issues of the text and its organization, with much emphasis given to the importance of learning to compose complete sentences with proper capitalization and punctuation.

Ms. Avery apparently saw her primary role in writing instruction as focusing children on sentence formation and on ways that sentences within a paragraph are related. She stated that one should teach writing, especially to "poor writers," by initially limiting the amount that children are allowed to write. Until students are able to write five or six "good sentences," they should not be allowed to write longer text, she said.

Before CSIW, most writing tasks in her classroom were about teacher-selected topics and were read only by the teacher. Much student writing was at the sentence level (e.g., answering comprehension questions by writing a sentence that tells what the question was as well as gives the answer). She indicated that more complex assignments (e.g., report writing, participation in the district's short story competition) were not appropriate for her students, most of whom were "not at grade level." Of her class, she said that "only half of them can create a paragraph correctly."

Ms. Avery's practice with CSIW was rated as lower in congruence than most other teachers. She taught the program twice a week (and taught other language arts on other days), and did follow the general framework and suggestions in the teachers' manual (created by the CSIW developers and given to all the teachers) for introducing each new part. However, except for the formal presentations, her ways of talking with the students about writing did not reflect the premises underlying the model--that writing is a cognitive and social process. Mechanics and sentence structure continued to feature prominently in her writing instruction. She did few think-alouds not explicitly recommended in the manual, and she seldom asked the students to elaborate on their thinking about writing. She did not talk to or with the children explicitly about the links among the components of the writing process, nor did she emphasize (except during the formal presentations about planning) that writers think about and make decisions in light of their anticipated audience. Only one book of student writing was published (although the researchers offered to type and bind others), and no public sharing of individuals' writing were observed or mentioned by the teacher.

The teacher's adaptations and additions to CSIW sometimes took the form of removing an element of the program from the context of authentic writing for real audiences and turning it into the object of skill practice, which was congruent with other language arts activities that she used. For example, when the explanation structure was taught, she created games in which students competed to see which row could most quickly compose a detailed explanation for an activity named by the teacher. Criteria for evaluation included those details the teacher deemed relevant, in the order that she thought made most sense, and she was the only audience, evaluating the students by awarding points for a competition. She did not mention tailoring the explanation to particular audiences and purposes.

In spite of Ms. Avery's frequent comments (often interpreted by her researcher/consultant as complaints) about the lack of emphasis on mechanics in CSIW, she ended the year saying that she would use CSIW again. She felt that students' papers were better organized this year than in years past, especially explanations. She felt that the program had worked because it provided such clear formulas and structures for the students to follow. However, she felt that this was more true for the explanation than the comparison/contrast structure, which she faulted for not providing a clear recipe to the students that might specify, for example, that one paragraph should be for "alikes," and so forth. (The researcher/consultant had discussed this matter with her at some length, stating that one recipe would not be equally appropriate in all cases and that writers should choose what best fit their purpose and audience, sometimes organizing by attributes, sometimes by similarities, and so forth. However, Ms. Avery decided to teach it by providing a standard format that students must follow.)

In her final interview, she seldom talked about students' thinking about writing, but instead focused her comments on the kinds of text they produced, especially the organization and coherence of the texts. She apparently still believed that the most important role for a teacher of writing is to make the structure and organizational schemes for writing available to students and to make sure they learn them. However, she did say that she had liked the think-aloud technique and would use it again, and so did not only emphasize written products. In spite of this statement, little in the interview suggests that she had decided that modeling the thinking processes used by fluent writers was essential to students learning to write.

Conclusion. Ms. Avery was a teacher who began the study with strong beliefs about the importance of form and mechanics and about the teacher's role in direct instruction about proper form. She interpreted CSIW in light of those beliefs and ended the year evaluating CSIW in those terms. She paid more attention to the text structure elements of CSIW than to the elements that emphasized the cognitive and social aspects of the writing process. From this perspective, she liked the program and said she would continue to use it. While her enactment of CSIW was not very congruent with the developers' vision, it was quite congruent with her own preexisting visions of writing instruction and her beliefs about what teachers should do to help children learn how to write. Thus, her enactment of CSIW was very sensible and rational from her perspective.

Ms. Baker (Higher Congruence, Regular Classroom)

Ms. Baker was enthusiastic about the project throughout the year and appeared to enjoy the interactions with the researcher/consultant and other teachers about CSIW. At the beginning of the study, she expressed a lack of confidence in her ability to teach writing, although she felt that it was very important for her students. Teachers at her school had participated in the district's process-writing workshops, and she did have time scheduled when students wrote for publication, composing successive drafts, and working with peer editors. However, Ms. Baker was not comfortable with all aspects of these arrangements and raised questions about how to help the children, especially with peer editing.

In her first interview, Ms. Baker stated her goals as "selecting main ideas from paragraphs and building topic sentences" and also went on to say that she wanted her students to know how "to be a communicating person on paper, not only [by] speaking." It is difficult to determine from the interview her beliefs about the teacher's role in writing instruction.

Before CSIW, Ms. Baker engaged her students in frequent writing, and her description of tasks suggests that much of the writing was longer than single-sentence answers. For example, she said that students wrote summaries and personal reactions in several subjects (e.g., reading, social studies, science), and participated in the process-writing activities already described. While much of the writing was about topics designated by the teacher and read primarily by the teacher, some of the

writing was about student-selected topics, written for peer audiences and publication. Thus, students in her class before CSIW appeared to do more writing for more varied purposes than the students in Ms. Avery's class.

The teacher's practice with CSIW was rated as higher in congruence than most other teachers. She taught the program two or three times a week, following the recommendations in the teachers' manual when introducing each new part. Although she did not have many think alouds and dialogues that matched the developers' visions of these activities, she did attempt each, so that there was a fair amount of talk centered around writing in her class. She did emphasize to the students the connected nature of the writing process, rather than teaching the components (plan, organize, write, and so forth) as if they were separate tasks. Several books were published and students shared their writing with each other through authors' chairs.

During the post-CSIW interview, Ms. Baker described many ways in which CSIW ideas had been used in her teaching of other subject matter. For example, she said that students still wrote summaries and reaction papers in reading, science, and social studies, but this year she reminded them to use what they had learned about P.O.W.E.R. (the name for CSIW used with the students) in their writing in these subjects. She left the think-sheets available in her classroom to be used by the students whenever they wanted (in contrast to Ms. Avery, who kept the think-sheets in her supply cabinet and distributed them when she thought students needed them during CSIW time, but did not make them available at other writing times.)

In her final interview, Ms. Baker was very enthusiastic about the program ("I'm sold on it. Want a sales person? Here I am.") She reported that she now felt confident about teaching writing. She articulated ways that her thinking had changed about students' learning, saying that she now recognized the importance of expression--through talk or writing to others--in the learning process. Although she had begun the study feeling fairly favorable about students working together, she spoke even more forcefully in the final interview about the importance of social exchange of ideas.

She reported that CSIW had provided her with tools to do what she wanted to do in writing. She said, "I don't feel that I really taught writing before. I was part of a writing program with [the

school district], but it was so social and we didn't have any tools to go by." As a result, she had felt overwhelmed, especially with editing. Now she felt successful because, she said, she saw the students focus their attention on content, not mechanics, although she thought she saw improvement in paragraphing as a result of the program. Also, she saw that more students had discovered the "joy of writing" than in years past.

Conclusion. Before CSIW, Ms. Baker already believed that writing was important and that students needed many opportunities to write text that is longer than a sentence. Before CSIW, she spoke about many questions and uncertainties about how to improve her current writing activities. These pre-CSIW tasks tended to be compatible with CSIW tasks (i.e., they involved writing for some purpose other than displaying knowledge in single sentences, they sometimes involved social interaction about writing and sometimes led to sharing with audiences). Therefore, she began the study with questions and personal concerns that could be addressed by CSIW and she interpreted CSIW as responsive to her needs as a writing teacher. She paid attention to those elements of the program that helped her and the children develop a better understanding of writing as a social process that communicates meaning. However, this was not an entirely new view for her.

A focus on the cognitive aspects of writing did not characterize her thinking before she encountered CSIW, but, on the other hand, there was nothing in her pre-CSIW interview that suggested incompatibility with a focus on the cognitive aspects of writing.

Thus, her enactment of CSIW, like Ms. Avery's, made perfectly good sense in light of her perspectives about what she and the students needed. Ms. Baker's and Ms. Avery's enactment of CSIW differed, at least in part, because they started from such very different perspectives about writing, teaching, and learning to write.

Ms. Cassells (Lower Congruence, Resource Classroom)

Ms. Cassells was less actively involved in the study than many of the other teachers. She did not engage in a great deal of conversation or questioning about the program during the researcher/consultant visits, nor did she add to or adapt the lessons suggested in the manual in

significant ways during the observed lessons. However, she remained friendly and did not seem anxious about the consultant's visits.

During her first interview, the teacher expressed goals of wanting her students to be able to communicate in writing, and when asked for specific examples about what should be learned, she mentioned that goals for older students would be the ability to write a complete sentence with correct capitalization and punctuation. For younger students, her goals were legible handwriting and oral creation of stories. She expressed the belief that "poor writers" needed instruction that was in small increments, that they should not receive as much instruction at one time as "good writers."

Before CSIW, Ms. Cassells' writing tasks were mostly short-answer assignments or copying tasks. Occasionally the whole group would compose a story together that she would write on the board for the students to copy. Apparently, there was little to no writing of extended text by the students (although assignments varied by individual). Students did not work together on writing because, the teacher said, the many different schedules of arrival from and departure to the students' regular classrooms would mean that peer cooperation would "make things unsettled."

The teacher's practice with CSIW was rated lower in congruence than most other teachers. She presented about two lessons a week based on CSIW and did cover each of the text structures and each think-sheet. Her lessons tended to follow the example lessons included in the manual very closely (even sometimes reading verbatim from them), and the researcher/consultant sometimes noted in the informal observation notes that there appeared to be little advance planning for teaching CSIW. There was very little evidence from the observations that the teacher called attention to the cognition underlying writing, nor did she highlight the importance of audience, except when either of these features was explicitly referred to in the teachers' manual and/or lesson scripts. There was little teacher modeling of writers' thinking; instead her presentations about the think-sheets consisted of procedural directions about how to complete them.

Classroom discussions about writing were somewhat disjointed, with students providing short answers (or remaining silent) when the teacher asked questions. The teacher seldom made links among student ideas, and even responded in ways that appeared to take discussions off into other directions,

rather than developing a single idea in more depth. Students did write papers and published them in class books, which she reported that she had not done before. When writing, students' use of the think-sheets appeared to be superficial (i.e., the consultant reported that students treated them as assignments that had to be finished). Peer editing occurred, but the consultant noted that the students were more likely to go to the teacher for assistance than to go to a peer.

During the post-CSIW interview, the teacher indicated that she liked the program and intended to use it the next year. She reported that she most liked the structure of the program because it provided both her and the students with a focus and goal for writing. She felt that the students had benefitted and appeared better able to express themselves and attributed this to the program being "more within their grasp." That is, CSIW "broke down" a complicated task into its components and allowed the students to think about one part at a time.

In spite of her satisfaction with the structure she perceived in the program, there were other parts that she did not like. She reported that it was difficult for the students to categorize their ideas after brainstorming (as the planning think-sheet prompted them to do.) She said that the students just didn't know how to do this, and she did not know how to help them. She also was not pleased with peer editing, reporting that some students just did not "catch on" and that students were too competitive to take suggestions from each other well.

Conclusion. Ms. Cassells' beginning beliefs about teaching writing were not easily inferred from the pre-CSIW interview. Her description of past practice suggested that she kept her students busy but that they seldom engaged in very complex thinking about what to write and how to express an idea in writing.

In the first interview, she expressed the view that "poor writers" needed to get instruction in small increments, and her post-CSIW interview reflects similar thinking--she liked the program because it "broke down" writing into smaller steps. There was nothing in her post-CSIW interview that suggested that she saw the component steps as parts of an interrelated and recursive cognitive and social process, the view of writing that underlay the vision of the program developers and that were (in the researchers' eyes) an important theme in the staff-development sessions in the fall.

She saw the program as a support for her, providing some definite content to teach about how to write, but seemed at a loss when the manual did not specify what to say (e.g., she did not know how to help students think about categorizing ideas or how to model the thinking of a writer). Thus, she appears to have interpreted the program in light of her original ideas about what students need (i.e., small pieces they can handle one at a time) without having acquired a more cognitive and social view of writing. Like the other teachers in these case studies, her use of CSIW was quite congruent with her entering practices and beliefs about what students needed in order to learn to write.

Ms. Donovan (Higher Congruence, Resource Classroom)

Ms. Donovan enthused about the project from the start and remained so throughout. She appeared to enjoy the researcher/consultant's visits, inviting her to become involved in the lessons and articulating her pleasure that collaboration was occurring. She indicated in the pre-CSIW interview that she enjoyed teaching about writing and was curious about children's language development and how that related to their learning to write.

Ms. Donovan described her goals initially as helping students to get their ideas from their minds to the paper. She emphasized the importance of the idea that writing is a message going someplace and that knowledge of the conventions of mechanics helped to move the message. She indicated that she responded to student papers initially in terms of the content, being careful to avoid correcting mechanics too soon and demoralizing the child. While she talked in these ways about writing as a cognitive and communicative process, she also felt that her role as a resource room teacher was to help the students learn "the basics," to become comfortable enough with mechanics so it would be easier for the classroom teacher to motivate them to write.

Her pre-CSIW writing instruction was varied and mostly individualized, a common pattern in all of the resource classrooms in the study. Students wrote daily, sometimes only with short answers, but sometimes with more extended text. She had taught everyone how to write on the computer and regularly assigned them time to compose stories which would then be edited by the teacher and the child and sometimes shared with others in the class. Other writing assignments involved the child writing about personal experiences or feelings. Throughout her pre-CSIW interview, there were

references to students' thinking and to her efforts to provide students with cognitive tools or "crutches" that they might use briefly and then discard (e.g., cognitive mapping as a way to plan one's writing, relying on her to help edit stories on the computer until they acquired the skills).

During the CSIW year, Ms. Donovan was rated higher in congruence than the other teachers. She taught CSIW twice a week, not only following the general recommendations in the manual but elaborating in spontaneous ways through her conversations with the students about audience and about the thinking that is involved in writing. For example, she frequently engaged the students in discussions of the reasons for asking the questions posed on the think-sheets. The consultant reported that writing in this classroom was never presented as a mechanical, rule-driven process, and the think-sheets were not treated as assignments that just had to be completed.

The one element of the program that the teacher did not enact as had been envisioned by the developers was thinking aloud about her own writing processes. Instead, most of the emphasis on writing as a cognitive and social process was conveyed through teacher-student interactions about the students' writing.

Students in this class interacted with each other a great deal, and the teacher encouraged this by talking explicitly about the value of "kids teaching other kids" and about her own learning from the students. She introduced editing to the students by relating the process to publication, leading a discussion about adult writers and editors who work together to publish newspapers or books.

In the post-CSIW interview, Ms. Donovan reported that she had changed her practice and her thinking as a result of CSIW. She perceived greater attention on her part to students' thinking processes, with correspondingly less emphasis given to mechanics. She felt that the students' improved writing and motivation to write were attributable to her increased focus on their ideas rather than the mechanics. She also reported that she now recognized that "poor writers" do have good ideas and saw this as a significant change in her thinking.

She said that she and the students frequently saw ways that CSIW principles applied to other subjects (e.g., seeing explanation text structures in reading materials). She also reported that students

in her class were working together on assignments for many subjects, not just writing, and attributed this to their enjoyment of peer editing.

When asked about the best-liked part of CSIW, she responded that it provided a valuable structure that highlighted writers' cognitive processes and that she valued this feature. She reported that CSIW helped her to see connections among the many types of writing assignments that she had used before when she had felt unable to tie them together in the students' minds in some way.

The only "least-liked" feature of the program she named was the length of the written materials for teachers, especially the example lessons (which she read when planning, but did not follow as scripts).

Conclusion. Although Ms. Donovan's initial thinking about writing appeared to the researchers to be more congruent with CSIW principles than any other teacher in the sample, she felt that she had undergone significant change as a result of her experience with CSIW. While the researchers would not deny those changes, they saw them as fine tuning and elaboration of preexisting ideas, not major changes in her basic approach to teaching writing. For example, it appeared that Ms. Donovan found the focus on student's cognition within CSIW to be appealing and sensible, perhaps because she had already thought a lot about her students' thinking before beginning the study. The program provided her with some new ideas and insights about students' thinking during writing but did not contradict the basic assumptions she held before beginning the study about the importance of understanding how children thought about and talked about something.

Similarly, she believed from the beginning that the content of students' writing was important and should be respected, and that teachers should not jump too quickly to correcting mechanics. Even so, she felt that her approach to teaching about mechanics had changed as a result of CSIW, and she reported that she would delay feedback about mechanics longer, now that students were working on successive drafts with one another.

Discussion

The internal consistency of the teachers' entering beliefs and their responses to CSIW were quite striking in these four cases. Teachers entered the CSIW study with beliefs about writing,

instruction, their students, and themselves as teachers of writing. Their practice with CSIW (and any resulting effects on their students) can be understood only in light of those entering beliefs. While their experiences with CSIW may have resulted in teachers' acquiring new knowledge about writing instruction, any new learning was very consistent with each teacher's original thinking. Within these four cases, there were no examples of significant conceptual change--a major shift in their theories about the teaching and learning of writing. In each case, teacher change--as both the teacher and the researcher perceived it--was consistent with the original beliefs about writing and writing instruction that were expressed by the teachers.

We offer here two sets of hypotheses or conjectures that can be derived from our findings. First, we offer conjectures about why students' performances were associated with the ways that their teachers enacted CSIW. Second, we offer conjectures about why teachers' entering beliefs about writing would be associated with their enactment of CSIW.

Conjectures About the Relationship Between Teachers' Enactment of CSIW and Student Performance

One conjecture is that only those teachers whose entering beliefs were congruent with the principles underlying CSIW were likely to interpret and use the program in a manner that fostered students' capacity to write well when presented with tasks in which text organization was not cued. Other teachers, whose entering beliefs were not as congruent with the principles underlying CSIW, used the program in ways that facilitated student learning to reproduce text structure when explicit cues were given, but not to impose organization in the absence of explicit cues.

Here is one possible explanation for how this situation might arise. Higher congruent teachers created or recognized multiple and varied occasions in which they could situate talk about the cognitive and social aspects of writing. For example, Ms. Baker and Ms. Donovan (higher congruent teachers) differed from Ms. Avery and Ms. Cassells (lower congruent teachers) in the extent to which they made spontaneous comments about, for example, audience, writers' cognition, and the role of editors. These spontaneous comments occurred both as elaboration within the formal lessons and as part of conversation about students' writing, both in and outside of CSIW time. Another way in which Ms. Baker and Ms. Donovan created occasions in which they could situate ideas about writing was by using

CSIW language and thinking when text was read or written in other content areas (e.g., social studies, science, literature).

Thus, Ms. Baker and Ms. Donovan attempted to relate general underlying principles (e.g., authors use cues to communicate text structure that helps readers comprehend the author's intended meaning) to multiple situations which can be understood or explained in terms of those principles (e.g., "See how the author of this passage in the social studies text made it clear that she was comparing two things by using the words, `in contrast'? How is that like what we talked about yesterday during writing time?").

Of course, it is possible for students to learn such principles at a low level, to be repeated back to the teacher when asked for in a familiar form. But in order to actually use principled knowledge in practical situations (such as new writing tasks), the student must have learned about how the principle is useful in similar situations. This will most easily occur when the teacher (or other mediator, such as peers) help make the connections clear between principles and situations (Collins et al., 1989; Perkins & Salomon, 1989; Prawat, 1991; Salomon & Perkins, 1989).

This view reflects relatively new thinking about the nature of transfer of knowledge during problem solving. While older notions of transfer portrayed knowledge as being applied intact to a new situation (as if knowledge came packaged as decontextualized chunks which could be dropped where needed once they were retrieved), newer notions of transfer recognize the ways in which principled knowledge is only learned in conjunction with the situations in which it is used. Thus, principled knowledge may be more or less richly situated, depending on the degree to which it is associated with multiple, varied situations (Perkins & Salomon, 1989).

When teachers help students to see connections between what they have learned in one situation and how they might think about a different situation, they help the learner form more richly situated knowledge. When principled knowledge is linked to more, rather than fewer, situations, it is more likely to be used by the learner when a new situation or problem is encountered.

In the case of the writing performance measures, students were asked to respond both to a familiar situation (produce a text structure as was done in CSIW lessons) and to a less-familiar and

less-specified situation (produce text after deciding whether and how organization should be imposed). It is likely that those students who did better in the less-familiar situation had more richly situated knowledge about writing that allowed them to perceive and frame the problem as one in which their knowledge about creating text and about text organization might be useful.

Thus, if other higher congruent teachers were like Ms. Baker and Ms. Donovan, creating more occasions for situating principled knowledge than the less-congruent teachers, then differences in the student performance data might be partly explained. Students who had many opportunities for learning about writing as a cognitive and social process were more likely to do well on an ill-structured task. Students who had learned about writing in fewer situations, primarily formal lessons defined as "writing time," performed equally well only when those situations were recreated during the testing. In less-familiar, less-structured tasks, they did not draw upon their knowledge about the writing process and text structure.

Conjectures About Why Teachers' Entering Beliefs Were Related to Their Practice With CSIW

If the above conjecture is accepted as reasonable (i.e., that the higher congruent teachers were creating more occasions for situating students' learning about writing), then it raises another question about why some teachers were more likely than others to recognize and create such occasions. To consider this question, we once again ground our conjectures in the four cases.

There were at least two related sets of beliefs that distinguished the two higher congruent teachers from the two lower congruent teachers: (1) beliefs about the nature of writing and (2) beliefs about what students bring to writing instruction and what they need from the teacher. We conjecture that teachers' beliefs in each area predisposed them to notice and perceive different instructional potential in classroom events. Thus, the higher congruent teachers (Baker and Donovan) began the study already prepared to see some kinds of occasions as likely "teachable moments" for helping students learn about writing as a cognitive and social process. In contrast, the lower congruent teachers (Avery and Cassells) were likely to define different occasions as good opportunities for elaboration about different aspects of writing that were important to them.

For example, the teachers' views about the nature of writing affected what they were likely to notice and comment on as an important feature of a student's writing. Teachers who saw mechanics or other elements of form as the most important target of elementary school writing instruction (as did Ms. Avery) were more likely to see a piece of student writing as an occasion to comment on form rather than an occasion to reinforce ideas that the text was written for an audience or that writing involved cognitive questions by the writer.

In Ms. Avery's case, this predisposition probably kept her from identifying occasions outside of the formal lessons in which she could use a student's writing to highlight social and cognitive features of writing. Thus, her students heard different messages from her formal lessons (where she talked about audience and purpose as suggested by the manual when introducing the think-sheets) and her talk with them about writing on other occasions. As a result, her students may not have organized any new ideas about the cognitive and social aspects of writing (presented to them in the formal lessons) in a way that connected the knowledge across a variety of writing situations.

In contrast, Ms. Baker and Ms. Donovan, who saw the nature of writing as primarily the communication of meaning through text, were more likely to see student writing as occasions to talk about how an audience might interpret text and how a writer might consider that audience, two ideas introduced in the formal CSIW lessons. As a result, their students heard a more consistent and coherent message about what writing is and how it is accomplished, in both the formal lessons and in other interactions about text.

Teachers also differed in their views of what students brought to the study of writing and what they needed from teachers. For example, Ms. Avery viewed students as needing to get information about good writing from the teacher. This view may have predisposed her to notice occasions when she could tell students what they should do or correct, while rendering her less likely to notice occasions when she could engage the student in a scaffolded dialogue that would help a student think through a writing problem and construct or coconstruct a solution.

Ms. Cassells seemed to view students as needing to be exercised through tasks and appears to have attributed their learning to such exercise. For example, in the pre-CSIW interview, more than

once she referred to students "not catching on" as the result of doing an activity. She expressed concern in the post-CSIW interview about the lack of specificity about how students could organize their ideas and did not know how to help when they did not do this spontaneously.

Such comments suggest that Ms. Cassells did not view herself as a mediator of the students' understanding through her own ways of knowing and talking about writing. Instead, she may have seen herself as the conduit of information that originated outside of her. Such a view of the teacher's role did not predispose Ms. Cassells to reflect on her own writing and model the cognitive processes she used (even though she told the consultant that she wrote frequently and had even published a piece in a special-interest journal). Consequently, the only occasions in which her students heard about writing as a cognitive and social process were the formal lessons, and few if any connections were made between this content and their actual writing.

Ms. Donovan, in contrast, even before CSIW, was very attuned to students' ways of using what she called "crutches" or strategies to help them solve problems. She saw the decision to use or to discard such crutches as the students', not hers, although she did think that an important teacher role was teaching about such strategies.

Such thinking probably predisposed Ms. Donovan to engage in the kinds of scaffolding recommended by CSIW and to think about the think-sheets as temporary scaffolds to be used until the students were ready to give them up. Consequently, her interactions with her students about their writing often included references to ways that think-sheets were helping or pointing out that students no longer needed to rely on the think-sheets. This was one way to situate for the students what they had learned about the cognitive questions asked by writers, and it may also have helped them to distinguish between the act of completing the think-sheets and the value of thinking about the questions. This step seems necessary if students are to internalize the questions and use them in a variety of writing situations.

Thus, the four teachers' entering beliefs about writing and about their students' needs are consistent with, and may have driven, their instructional actions. We conjecture that the instructional action most affected by their entering beliefs was the creation of opportunities to help students see

connections between the principles presented in formal CSIW lessons and students' own experiences with writing and other text.

Given that all four teachers felt positive about CSIW at the end of the year and felt that they had used it in appropriate ways, it is unlikely that the low-congruent teachers' ways of interacting with their students around writing represented deliberate efforts to counter or sabotage the program. Instead, it is more likely that their underlying beliefs about the nature of writing and students' needs were so strong and so implicit that, in the rapid pace of classroom life when teachers can not stop to ponder whether their actions are perfectly consistent, the deep-seated beliefs served as an automatic pilot when responding to events and student writing.

The staff development that accompanied CSIW, while it seemed extensive at the time, was not sufficient to make teachers aware of the deep-seated beliefs that drove their interactions with students and their ways of representing subject matter. While the teachers may have left the day-long staff development sessions with some new ideas about writing, that experience alone was not sufficient to help the teachers revise their own thinking and beliefs about how writing should be taught, and their entering beliefs about the basic nature of writing and learning to write were unchanged. As a result, their enactment of CSIW was determined by the beliefs they held when they started and CSIW's effects on writing performance were mediated by the ways in which the teachers' beliefs were reflected in their interactions with students.

This does not mean that CSIW did not have some overall beneficial effects. Many of the teachers, including lower congruent teachers, were generally satisfied and felt that they had gained something from participation in the study. Many indicated that they planned to use elements of CSIW in future years (as did each of the four teachers described above). Although there were student performance differences associated with patterns of teacher enactment, there was also evidence that all students, even in the lower congruent classrooms, learned something worthwhile about writing from their participation with CSIW. However, these data do suggest that the program per se did not influence students' learning. Rather, the program *as interpreted and enacted by individual teachers* constituted the treatment in this experimental study, and results must be understood in those terms.

Other Studies of Teachers' Learning About Constructivist Models of Instruction

The conjectures offered here to explain variations in teachers' practice and students' performance have been informed by other work in which teachers were encouraged to change their practice in ways congruent with a constructivist and/or social constructivist perspective on learning and teaching. Several research studies have examined this process and, like the present study, have found that teachers' entering beliefs often appear to determine how they respond to and enact new instructional programs and models.

For example, one study described teachers in California who were responding to state mandates that mathematics be taught for understanding, using a new text that recommended practices to aid students in construction of mathematical meaning (Cohen, et al., 1990). They found that the teachers' classroom practice represented interpretations of the policy and new textbook in light of preexisting practice, knowledge, and beliefs. Rather than a drastic shift in the nature of classroom instruction, the new policy about teaching math for understanding led, in several cases, to slightly revised practices that did not represent the intention of the policy makers. Cases of these teachers sound very much like the CSIW cases in that the teachers often felt that they were indeed implementing the policy and making significant changes, although to an outsider's eye and ear, there was little fundamental change in the teacher's treatment of the subject matter and the implicit, underlying assumptions about the nature of teaching and learning.

Similar results in science were reported by Hollon et al. (1991). They studied teachers who agreed to adopt a conceptual-change approach to teaching science. They found that the extent to which teachers used the new curriculum and instructional model, and their feelings about the program, related to their entering beliefs about the nature of science and how it is learned. Similarly, Johnston (1988) describes two high school science teachers who had very different interpretations of how to act upon a constructivist model and whose lessons about the same content differed drastically as a result.

Two studies relate student performance to teachers' beliefs and practices following staff development about a model of instruction based on social constructivist principles. Palincsar et al. (1989) studied teachers' use of reciprocal teaching, an instructional model which assumes that learners

construct their own understandings of how to comprehend text through interactions with others about text. Reciprocal teaching, like CSIW, suggests that teachers should play more of a mediator role and less of a direct instructor role than is typical. Palincsar et al. found that some teachers' entering beliefs were reflected in their enactment of reciprocal teaching, transforming it into the teacher-directed patterns of instruction to which they were accustomed.

Palincsar et al. (1989) report links between the teachers' entering beliefs and student performance, and their results parallel the results of the present study. All teachers enacted reciprocal teaching in some form, but they differed from one another in the congruence of their entering beliefs with the premises underlying reciprocal teaching. For example, some teachers believed that reading instruction should present a sequence of isolated skills, a position incongruent with the view of reading held by the developers of reciprocal teaching. Student outcome measures included both a direct measure of what had been taught (strategy knowledge) and a transfer measure of independent reading comprehension.

Just as in the CSIW study, there were no differences between the high-congruence and low-congruence groups on the most direct measure of what had been taught, but there were differences in student performance on the transfer measure of comprehension: students whose teachers' entering beliefs were more congruent with reciprocal teaching performed better on the transfer measures. When the transcripts of lessons were analyzed, there was a corresponding difference in the quality of the teacher-student dialogue, with students of the more congruent teachers receiving many more opportunities to practice comprehending text as well as more appropriate teacher support for learning the comprehension strategies.

A similar pattern was noted by Peterson et al. (1989), who studied first-grade math teachers who learned about constructivist methods of teaching mathematics. Their teachers differed in the extent to which their beliefs about mathematics and its instruction were cognitively-based. They found that teachers who were more cognitive (or constructivist) in their orientation had students whose performance on problem-solving measures was greater than that of students whose teachers were not as constructivist in their orientation. However, the two groups had comparable performance on measures

of number facts. In examining teachers' reports of their practice, the researchers noted differences that could account for the students' performance, especially in the more constructivist teachers' creation of problem-solving opportunities, which were linked to their beliefs about the students' capacity to solve problems.

The Palincsar et al. (1989) and the Peterson et al. (1989) studies reveal a similar pattern to this study of CSIW. In each case, teachers differed in their enactment of an instructional model based on constructivist principles, and their enactments appeared to be affected by their own preexisting beliefs about teaching and learning. Teachers whose preexisting beliefs were more congruent with the constructivist models had students whose performance on higher level or transfer tasks (though not lower level tasks) was superior to students whose teachers' beliefs were less congruent. In each case, differences in student performance were attributed, at least in part, to the more congruent teachers' creation of multiple and varied opportunities for problem solving in the content area, helping the students see connections across multiple tasks and problems. The teachers' practices in this regard related to their underlying beliefs about the subject matter, how students learned it, and what the teacher needed to do to foster that learning.

Other Research That Suggests Ways That Teachers Learn About Constructivist Views of Teaching and Learning

The studies cited in the preceding section may appear to suggest that efforts to change classroom practice will only succeed if one works with teachers whose perspectives are already congruent with those views. This is not the impression with which we wish to leave the reader. The studies cited above do suggest that learning new patterns of practice is not an easy matter, and that teachers or persons who work with teachers should recognize the power of deep-seated beliefs and the ways that they enter, often unconsciously, into the many rapid decisions made by teachers when interacting with students about subject matter.

Other work suggests that one reason that most typical staff development efforts do not lead to changes in teachers' deep-seated beliefs is that they are simply insufficient in time and depth of focus. Many inservice programs (including the present study) can be faulted in the same way that some

classroom instruction can be faulted: Unless learners are given adequate opportunities to construct understandings of general principles through meaningful encounters with those principles in multiple and varied situations that pose authentic problems and that afford opportunities for social interaction about the problem, they will not learn the principles in a manner that makes likely their use in problem solving in new situations, especially when those new situations require rapid responses without time to contemplate courses of action (a condition that characterizes much of a teacher's day).

However, providing meaningful encounters in multiple and varied situations with authentic problems is easier said than done. The designers of the CSIW study certainly thought that they were providing such opportunities, but the staff development was insufficient to alter the beliefs of the teachers who began the study in fundamental disagreement with the premises of the model. Nor were the resources for teaching writing and for further staff development (made available by the research staff) always sufficient or feasible when teachers faced a shortage of time and a multitude of demands by their students and by administrators. Under these circumstances, it makes sense that CSIW made the most difference with those teachers who began the study already in fundamental agreement with the program.

It is not the case that efforts to change teachers' practice in the direction of constructivist views of teaching are doomed to failure. For example, Neale, Smith, and Johnson (1990) describe work with elementary science teachers to help them learn how to take a conceptual change approach to teaching science. They spent four weeks with the teachers in an intensive summer workshop, in which teachers observed pupils working with one of the researchers and also studied the science topics themselves in more depth than they had done before. Then teachers and staff developers maintained regular contact during the year, with teachers receiving assistance in designing and evaluating their own units. Neale et al. (1990) report that 8 out of 10 of the teachers they studied generally succeeded in implementing their own conceptual change unit and also revealed very different ways of thinking about students' learning of science after the project compared to their entering views.

Similarly, two other programs that involved long-term, intensive support following summer workshops are the Summer Math program and the Columbia Teachers' College writing program. In

each of these efforts, teachers changed not only the superficial aspects of their practice but also some underlying beliefs about the nature of the subject matter and about students' learning and teachers' roles (National Center for Research on Teacher Education, 1991).

Duckworth (1987), Fosnot (1989), and Richardson and Anders (1990) also describe instances of teachers changing fundamental beliefs in the direction of more constructivist, less teacher-centered ways of providing instruction.

In all of the cases just cited, there was an attempt to deal with teachers as if the theories about learner construction of meaning applied to teacher learning as well as to the learning of K-12 students. Sufficient time and multiple, varied opportunities to use new knowledge were offered, and there was shared recognition that significant change takes time and effort by all involved parties. Two elements shared by the projects just described that may also be critical factors for teacher learning were attention to the content being taught (especially when the teachers were not strong in their content knowledge) and explicit attention to ways that teachers can learn about their students' understanding.

One conclusion that can be drawn from such efforts is that research-based programs to improve the subject matter learning of students cannot draw only from research about instruction and about students' learning. Unless research and the wisdom of practitioners concerning teachers' learning is also heeded, then widespread implementation of constructivist-based practices in classrooms is unlikely, no matter how compelling the underlying theory and research on students' learning. It is not enough to attend to instructional variables as if they existed independently of teachers. Researchers, even those whose primary interest is student learning, must recognize that instruction is enacted by teachers in complex, demanding environments, and that in such environments, teachers' fundamental beliefs about teaching, learning, and subject matter exert great influence on instructional action. Thus, understanding teachers' beliefs about teaching and learning is a necessary element for understanding how students learn from classroom instruction and how educators can improve all students' opportunities to learn.

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